

ATTACHMENT 15

UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN FRANCISCO DIVISION

)
SURGICAL INSTRUMENT SERVICE)
COMPANY, INC.,)
)
)
Plaintiff,) Case No. 3:21-cv-03496-VC
)
vs.)
)
INTUITIVE SURGICAL, INC.,)
)
)
)
Defendant.)
_____)

HIGHLY CONFIDENTIAL, ATTORNEYS' EYES ONLY DEPOSITION OF:
KURT HUMPHREY
WEDNESDAY, MARCH 15, 2023
10:25 A.M. (MST)

Reported by: GINA M. CLOUD
CSR No. 6315

1 Q. You mentioned reviewing your reports in this
2 case. You've issued two reports in this case; is
3 that correct?

4 A. Yes. The original expert report and a
5 rebuttal report. 09:37:54

6 Q. And that original expert report was
7 submitted in approximately December of 2022, correct?

8 A. Correct.

9 Q. If I refer to that report today as your
10 opening reporter, your December report, will you know 09:38:09
11 what I'm talking about?

12 A. That's fine.

13 Q. And then you said there is a rebuttal report
14 you submitted on March 1, correct?

15 A. I believe that's the date, yes. 09:38:24

16 Q. And if I refer to that as your rebuttal
17 report, or your March report, will you understand
18 what I'm saying?

19 A. Yes, that's fine.

20 Q. You also submitted an expert report in the 09:38:38
21 Rebotix matter, correct?

22 A. That is correct.

23 Q. And that report is attached to your opening
24 report?

25 A. Yes, I believe so. 09:38:53

1 Q. If I refer to that report as your Rebotix
2 Report, will you understand what I'm referring to?

3 A. Yes.

4 Q. Mr. Humphrey, what are you an expert in for
5 purposes of this case? 09:39:32

6 A. Reverse engineering of microelectronic
7 devices.

8 Q. Reverse engineering of microelectronic
9 devices.

10 Anything else, or is that the full scope of 09:39:47
11 the expertise that you're advancing in this case?

12 A. I certainly have expertise in extensive
13 working knowledge of engineering design, system and
14 component design.

15 Q. Breaking each of those down, you said you 09:40:25
16 have expertise and extensive working knowledge in
17 engineering design. What's the basis of your
18 expertise and working knowledge of engineering
19 design?

20 A. I served as an engineering director for, 09:40:39
21 Taeus, and I spent most of 20-plus years in the
22 industry as a process development engineer or process
23 integration manager managing engineering programs.

24 Q. When did you work at Taeus?

25 A. From 1999 to 2005. 09:41:19

1 Q. After that did you have any role as an
2 engineering director or in process engineering?

3 A. Only in my own engineering consulting
4 business.

5 Q. What experience do you have in your 09:41:45
6 engineering and consulting business relating to
7 engineering design or system and component design?

8 A. I've assisted some clients in doing
9 characterization of their products and their
10 manufacturing processes. 09:42:10

11 Q. What do you mean by "characterization of
12 products and manufacturing processes"?

13 A. Characterization basically involves
14 recording, monitoring, and specifying parameters that
15 are important in either the manufacture of a given 09:42:37
16 product or in the operation performance reliability
17 of a given product.

18 Q. So when you're advising a client on
19 characterization, what are the steps that you
20 undertake in advising them on operation performance 09:43:07
21 reliability?

22 A. Some of the early steps are certainly to
23 understand the nature of the product, the desired
24 product performance, what is the product designed to
25 do, what is the application for the product, and 09:43:30

1 keypunch cards and running them as batch jobs on an
2 IBM 360 main frame, so it does not look a like
3 computer sciences of today.

4 But we were writing programs in Fortran, as
5 I recall, maybe a couple other languages at the time. 09:55:21

6 Q. Now you teach at a university, correct?

7 A. Yes. I do adjunct instruction in chemistry
8 for engineers.

9 Q. Chemistry for engineers?

10 A. Uh-huh. 09:55:47

11 Q. Is that the specific class name or what is
12 the specific class name that you teach?

13 A. It's general chemistry. I say for engineers
14 because my students by and large are engineers.

15 Q. Is that general chemistry class typically an 09:56:15
16 entry level chemistry class for freshmen or people
17 that are early in their trajectory?

18 A. Yes.

19 Q. Do you cover inorganic and organic
20 chemistry, or does it focus on just one of those? 09:56:36

21 A. It's primarily inorganic chemistry, but we
22 do some sessions on organic chemistry as well.

23 Q. Have you taught any other classes?

24 A. No, not at a university level.

25 Q. Have you ever taught any classes on reverse 09:57:04

1 engineering?

2 A. Not formal classes outside the organization
3 which I was employed.

4 Q. Circling back to your educational degrees,
5 you said you have a master's degree in ceramic 09:57:37
6 engineering, correct?

7 A. Correct.

8 Q. Did you prepare a thesis or dissertation as
9 part of your master's degree?

10 A. Yes. 09:57:48

11 Q. What was the topic of your dissertation?

12 A. Microwave centering of varying titanate
13 ceramics and multilayer capacity.

14 Q. If you had to describe that, you know, give
15 the elevator pitch of what the focus of that thesis 09:58:06
16 was, how would you describe that at a general level?

17 A. Finding optimal ways to utilize microwaves
18 in the processing of barium titanate multilayer
19 capacitors.

20 Q. I'm sorry. I missed one thing you said. 09:58:38
21 Did you say titanium capacitors?

22 A. Barium titanate. Titanate, it's a barium
23 titanium oxide.

24 Q. What is your current role? Besides adjunct
25 professor, do you have other employment? 09:59:07

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1 A. Just my consulting business.

2 Q. And that's IP Enginuity LLC?

3 A. Correct.

4 Q. What is your role at IP Enginuity LLC?

5 A. I'm the founder, the owner, and the managing 09:59:24
6 director for the company.

7 Q. Does IP Enginuity LLC have other employees?

8 A. Not at this time, no.

9 Q. What kind of services do you provide through
10 IP Enginuity? 09:59:43

11 A. Basically all technical and engineering
12 services associated with largely -- largely
13 associated with intellectual property matters and
14 consulting on product process design and control.

15 Q. How long have you been working for or 10:00:19
16 leading IP Enginuity?

17 A. Since November of 2005.

18 Q. Focusing on the period between November 2005
19 and the present and setting aside the adjunct
20 professor role, have you had any other employment in 10:00:46
21 that time period besides IP Enginuity?

22 A. No.

23 Q. What did you do before you founded
24 IP Enginuity in November of 2005?

25 A. I was serving as director of engineering for 10:01:07

1 (Partial)."

2 A. Yes.

3 Q. What does the "partial" mean?

4 A. It means that there are pending depositions
5 where the date has not been set necessarily and could 10:12:34
6 be -- could have been prior to or shortly after this
7 edition of my C.V.

8 Q. So since you submitted this C.V. in December
9 1, 2022, have you testified in any other matters?

10 A. No. 10:13:00

11 Q. Have you been deposed in any other matters?

12 A. No.

13 Q. Have you submitted reports in any other
14 matters?

15 A. Not beyond the matter that we're engaged in 10:13:17
16 now.

17 Q. Other than your rebuttal report in this
18 case, you haven't submitted expert reports in any
19 other matters since the time you prepared this C.V.?

20 A. Yes, I believe that's true. 10:13:34

21 Q. So this should be an accurate list of all of
22 your testimony in the last four years?

23 A. Yes.

24 Q. And it also should be an accurate list of
25 all of your expert reports that have been issued in 10:13:52

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1 the last four years?

2 A. For those that have been submitted to the
3 court, yes.

4 Q. What do you mean by "submitted to the
5 court"?

10:14:10

6 A. I think I have written a couple of reports
7 that the client anticipated submitting in a case, but
8 either the case settled and it was not submitted or
9 something along those lines.

10 Q. A number of these cases, you list IPR cases
11 for Ocean Semiconductor LLC; is that correct? Ocean
12 Semiconductor was your client in those cases?

10:14:41

13 A. Yes.

14 Q. What is Ocean Semiconductor?

15 A. They are a nonpracticing entity owning a
16 number of patents.

10:15:17

17 Q. Approximately how long have you been working
18 with Ocean Semiconductor?

19 A. I'm going to say maybe three years.

20 Q. So turning back a page to your various jobs
21 after obtaining your degrees, as part of any of those
22 roles, have you ever performed a cybersecurity threat
23 assessment?

10:16:02

24 A. No.

25 Q. Have you ever been hired to consult on

10:16:37

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1 cybersecurity risks for any client's product?

2 A. Not that I recall, no. Not specifically for
3 that purpose.

4 Q. I want to turn next to Attachment 2 of your
5 report, of your opening report, titled "List of 10:17:10
6 Materials Cited." Do you see that?

7 A. I'm sorry. What page of the report are you
8 referring to?

9 Q. It says "Attachment 2" at the top right
10 behind your C.V. I don't see a page number on it. 10:17:32

11 A. Yes.

12 Q. Is this an accurate list of all the
13 materials you considered in preparing your opening
14 report in this matter?

15 A. Yes, I believe so. 10:17:55

16 Q. Were there any materials that you asked to
17 review in connection with preparing your opening
18 report?

19 A. Can you clarify the question, please? I'm
20 not sure I understand. 10:18:27

21 Q. Did you ask for any materials to use in
22 preparing the opinions that you presented in your
23 opening report?

24 A. I don't recall making any specific requests.

25 Q. I think this follows from that answer, but 10:19:10

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1 just to be clear, was there anything you asked to
2 review in connection with this case, but were not
3 provided?

4 A. I've asked some questions regarding
5 reliability, information, documentation, and field 10:19:32
6 returns or complaints, customer complaints. I have
7 not seen any documentation along those lines.

8 Q. I just want to make sure I got that list
9 down. You asked some questions about documents
10 relating to reliability? 10:19:58

11 A. Field failures, product returns, customer
12 complaints.

13 Q. Why would it be of interest in preparing
14 your opinions to see documents relating to
15 reliability? 10:20:27

16 A. To understand some of the design motivations
17 on the part of Intuitive.

18 Q. What about field failures, why would it
19 matter for purposes of your opinions to see documents
20 about field failures? 10:21:00

21 A. Product failures inform the planning and
22 engineering and design of next generation product.

23 Q. What do you mean by "failures"?

24 A. Product in the field that is not performing
25 to specification. 10:21:33

1 BY MS. CAHOY:

2 Q. Who is Gwen Mandel?

3 A. She is the software consultant that they
4 hired to analyze the X/Xi EndoWrist encryption.

5 Q. What did you discuss with Ms. Mandel? 10:58:45

6 A. Just the approach that she was using in some
7 of the tools and procedures she was using to
8 communicate with the EndoWrist and the Atmel CryptoRF
9 chip.

10 Q. Was anyone else present during the 10:59:35
11 discussions you had with Ms. Mandel?

12 A. No, I don't believe so.

13 Q. Did you attempt to replicate any of
14 Ms. Mandel's work on the X/Xi?

15 A. No. 11:00:02

16 Q. Did you undertake any steps to verify the
17 procedures she was using?

18 A. No. There wasn't any real need to verify
19 her work. The tools she was using and the steps she
20 was using are already known, and I've used those 11:00:26
21 procedures in the past.

22 Q. When have you used those procedures in the
23 past?

24 A. When we've been tasked with dumping code
25 from a target product for a client and analyzing that 11:00:45

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1 code and determining and doing software analysis.

2 Q. Have you used those procedures specifically
3 on an Atmel CryptoRF chip?

4 A. No.

5 Q. Have you used those procedures specifically 11:01:19
6 on an Intuitive EndoWrist product?

7 A. No.

8 Q. Did Ms. Mandel disclose any relationship she
9 had with other employees of Rebotix?

10 A. No, not at the time we spoke. 11:01:47

11 Q. Did she disclose that at another time?

12 A. I do remember later learning that I think
13 she is Stan Hamilton's daughter, but I'm going from
14 memory on that.

15 Q. Approximately when do you believe you 11:02:07
16 learned that?

17 A. I would say a month or two later maybe.

18 Q. How did you come to learn that Ms. Mandel
19 was Stan Hamilton's daughter?

20 A. I don't even remember. I think it was in a 11:02:31
21 conversation. I don't remember whether it came from
22 the attorneys that engaged me or from Stan or Gwen, I
23 don't know. I don't remember.

24 Q. Did the fact that Ms. Mandel was Stan
25 Hamilton's daughter affect your reliance on her 11:03:12

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1 procedures in any way?

2 A. No, none whatsoever.

3 Q. Is that a fact you would have wanted to know
4 before you put in your opening report?

5 MR. VAN HOVEN: Objection to form. 11:03:36

6 THE WITNESS: No, not necessarily. It's
7 irrelevant to my opinion.

8 BY MS. CAHOY:

9 Q. I want to turn to Section 3 of your report
10 where it says "Engagement and Compensation." This is 11:04:02
11 on page 4 and specifically I'm looking at paragraph
12 13 that lists the compensation for times that
13 preparing this report and deposition testimony.

14 So is it accurate that you are being
15 compensated at a rate of \$450 per hour for your work 11:04:32
16 in the Surgical Instrument Services case?

17 A. Yes.

18 Q. Approximately how long have you -- how much
19 time have you spent working on the case thus far?

20 A. I don't have an accurate amount of time for 11:04:57
21 that. I'm going to guess it's in the vicinity of
22 30 hours or so.

23 Q. And that would be in addition to the time
24 you spent working on the matter in connection with
25 the Rebotix case; is that correct? 11:05:22

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1 Q. And then can you read the next sentence,
2 please.

3 A. "Intuitive also states that the 'data on
4 RFID tag are encrypted and password-protected,' close
5 quote, and that the, quote, 'encryption key and use 11:56:19
6 counting data areas on RFID tag are one-time
7 programmable and cannot be modified once written,'"
8 close quote.

9 Q. Do you have any reason to believe that what
10 you wrote there in paragraph 23 is inaccurate? 11:56:40

11 A. No. I believe that is what you find in the
12 Intuitive references that are cited.

13 Q. Do you have any reason to believe that those
14 Intuitive references are inaccurate?

15 A. Not beyond what I would say is commonplace 11:57:22
16 in the industry and what Ms. Mandel has observed in
17 analyzing the data from the Atmel chip.

18 Q. So you believe something that is commonplace
19 in the industry makes this paragraph inaccurate?

20 A. No. The paragraph I think is accurate. I 11:58:07
21 would just question whether the statement made in the
22 Intuitive reference is actually accurate.

23 Q. And the basis for you questioning that is
24 what Ms. Mandel has told you?

25 A. Yes. That's one of the reasons, yes. 11:58:38

1 Q. So would it surprise you to learn that the
2 data on the RFID tag for the X/Xi EndoWrists is
3 encrypted at rest?

4 A. That would be new evidence that I have not
5 seen. 11:59:00

6 Q. If that were the case, would that change any
7 of your opinions?

8 A. No, I don't believe so. To the extent that
9 I have not been asked or opined on the amount of time
10 or resources that it would take to reset the use 11:59:27
11 counter, I think it might make the process more
12 difficult, but I don't think it would change the
13 final conclusion, no.

14 Q. And if you learned that Ms. Mandel was wrong
15 about the data on the tag being encrypted at rest, 11:59:58
16 would that call into question in your mind any of the
17 procedures she told you she was using?

18 A. Well, there would need to be additional
19 steps taken to deal with the encrypted data.

20 Q. Would that call into question in your mind 12:00:32
21 the technical qualifications of Ms. Mandel if she was
22 wrong about whether the data is encrypted at rest?

23 A. I guess I would have to say I don't feel I
24 can really give you a good answer to that. I'm not
25 privy to any of the work that she's done for over a 12:01:02

1 year and a half, so I don't even know for sure
2 whether she would still maintain that same position
3 or not.

4 MS. CAHOY: I know we've been going for over
5 an hour, so if now is a good time for a break, that 12:01:23
6 works on my end.

7 MR. VAN HOVEN: Let's go ahead.

8 MS. CAHOY: Can we go off the record,
9 please, Scott.

10 THE VIDEOGRAPHER: We are off the record. 12:01:33
11 The time is 1:01 p.m.

12 (At the hour of 1:01 p.m., a luncheon recess
13 was taken. The deposition was resumed at 1:30 p.m.,
14 the same persons being present.)

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25

1 Laguna Niguel, California, Wednesday, March 15, 2023

2 1:30 p.m.

3 THE VIDEOGRAPHER: We are back at record.

4 The time is 1:32 p.m.

5 EXAMINATION (RESUMED) 12:32:14

6 BY MS. CAHOY:

7 Q. Good afternoon, Mr. Humphrey. I'm going to
8 take us back to your opening report, so Exhibit 316,
9 and turning back to page 9, so this is of the opening
10 report, not the Rebotix Report. 12:32:36

11 A. Yes. I'm sorry. This is page 9 of the
12 opening report, correct?

13 Q. Yep. Paragraph 27 is what I'm going to ask
14 about next.

15 A. Okay.

16 Q. Toward the bottom of that paragraph right
17 after footnote 32, there is a sentence that begins:
18 "Contrary to unencrypted hardwired data
19 communications between the EndoWrist's Dallas chip
20 and the S/Si robot." 12:33:21

21 Do you see that?

22 A. Yes.

23 Q. Am I understanding correctly there that
24 you're saying the Dallas chip used in the S/Si
25 EndoWrist is not encrypted; is that correct? 12:33:36

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1 "Cleartext data has been extracted from the chip."

2 Q. And you did not do any independent
3 confirmation that Cleartext data had been extracted
4 from the chip?

5 A. No. 12:58:06

6 Q. You've never seen that data?

7 A. No, I don't believe so.

8 Q. What does Cleartext mean as you understand
9 it in that sentence?

10 A. Unencrypted. Cleartext data is unencrypted. 12:58:16

11 Q. So if either of these point in b or c were
12 untrue, if the data were encrypted at rest, this
13 methodology would not work as described here,
14 correct?

15 A. It would require that additional decrypting 12:58:44
16 of the extracted data.

17 Q. In 39c where it says, "Cleartext data has
18 been extracted from the chip," did you confirm that
19 the Cleartext data referenced there is the use
20 counter data? 12:59:14

21 A. No.

22 Q. So you don't have an understanding of what
23 Cleartext data had been extracted?

24 A. That is correct.

25 Q. And then b where it says, "Initial and 12:59:28

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1 follow-up scans have provided no indication that
2 encryption of the EEPROM data at rest is implemented
3 on all sectors of the chip," do you have an
4 understanding of which sectors of the chip do employ
5 encryption? 12:59:51

6 A. Per the Atmel data sheet, there is no
7 encryption feature associated with the data at rest,
8 only encryption of data that's being transmitted to
9 and from the chip.

10 Q. So your view is that it's just not possible 13:00:35
11 on the Atmel CryptoRF chip to encrypt any of the data
12 at rest on that chip?

13 A. No, I didn't say that. You can program data
14 into the chip in whatever form you like. The user
15 has the option of writing or programing whatever data 13:01:00
16 they like into the available memory space, and that
17 data can be encrypted or it cannot be encrypted.

18 Q. So it's possible to program the data onto
19 the Atmel CryptoRF chip such that it will be
20 encrypted at rest? 13:01:29

21 A. Yes, I think that's possible.

22 Q. Have you done any examination of the
23 X/Xi EndoWrist to determine whether the data on the
24 RFID chip is encrypted at rest?

25 A. I have not. 13:01:50

1 Q. So you're relying entirely on Ms. Mandel's
2 observations for your belief that it is not encrypted
3 at rest?

4 A. That, and the absence of any evidence that
5 I've seen of a decryption of process or algorithm on 13:02:08
6 the robot side, beyond decrypting the Atmel encrypted
7 communication.

8 Q. Are you familiar with secure personalization
9 of chips?

10 A. Yes. 13:03:04

11 Q. What is secure personalization?

12 A. Can you give me one minute to close my
13 office door, please.

14 Q. Of course.

15 A. Thank you. 13:03:35

16 Your question was regarding secure
17 personalization and, generally speaking, it's just
18 the protection of data that the user is programing
19 into the memory.

20 Q. Is secure personalization a type of 13:04:05
21 encryption?

22 A. Yes, it can be.

23 Q. When you say it's the protection of the data
24 that the user is programing into the memory, what
25 type of protection are you referring to? 13:04:40

1 Q. And that would have been that interview with
2 Stan Hamilton?

3 A. Yes.

4 Q. And you don't recall after that having any
5 communications with anyone at Rebotix?

13:19:58

6 A. That is correct.

7 Q. Including Gwen Mandel?

8 A. That is correct.

9 Q. Continuing on to paragraph 35, do you see
10 about midway through the paragraph where you say:
11 "It simply made it much more difficult, expensive and
12 time consuming"?

13:20:29

13 A. Yes.

14 Q. You're not offering an opinion on the
15 quantification of how difficult, expensive, or time
16 consuming it would be to reverse engineer the X/Xi
17 EndoWrist interface, correct?

13:21:00

18 MR. VAN HOVEN: Objection to form.

19 THE WITNESS: No. I'm not specifying any
20 quantity of time or resource necessary.

13:21:20

21 BY MS. CAHOY:

22 Q. And you haven't been asked in this case to
23 offer an opinion estimating the amount of time,
24 money, or resources it would take to reverse engineer
25 the X/Xi EndoWrist interface, correct?

13:21:36

1 A. That's correct. I have not been asked to
2 provide that kind of information.

3 Q. Turning next to paragraph 36 which starts on
4 page 14 and continues across to page 15 of your
5 opening report, I'm going to ask you specifically 13:22:05
6 about the last full sentence in the paragraph that
7 appears on the top of page 15.

8 Could you read that sentence for me.

9 A. "This reverse engineering work could have
10 been performed at any time in the last five years, if 13:22:24
11 not earlier, had the appropriate funding and
12 resources been available."

13 Q. What's the basis for your opinion in this
14 sentence?

15 A. Just that there is nothing that -- no 13:23:38
16 evidence I've seen that inherently shows this work
17 couldn't have been started much earlier. The work
18 that's been described in the previous page in the
19 references from the Rebotix and the Restore
20 testimonies, there is nothing obvious that would have 13:24:12
21 inhibited beginning that work and having completed it
22 in the previous five years if the appropriate
23 monetary resources and technical resources had been
24 available.

25 Q. Any other basis for that sentence? 13:24:39

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1 A. No, I don't think so.

2 MR. VAN HOVEN: Again, since you're sort of
3 at the end of a section, I wouldn't mind a break in
4 the relatively near future.

5 MS. CAHOY: I just have a couple last 13:25:04
6 questions relating to this section and then we can
7 take a break, if that's okay with you, Mr. Humphrey.

8 THE WITNESS: Yes, go ahead.

9 BY MS. CAHOY:

10 Q. So you haven't personally attempted to 13:25:12
11 reverse engineer an X/Xi EndoWrist?

12 A. That's correct.

13 Q. And you haven't been asked as part of the
14 opinions you're offering in this case to reverse
15 engineer an X/Xi EndoWrist? 13:25:26

16 A. That's correct.

17 Q. And you were not asked in the Rebotix case
18 to reverse engineer an X/Xi EndoWrist?

19 A. That is correct.

20 Q. And you have never successfully reverse 13:25:40
21 engineered an X/Xi EndoWrist?

22 A. That's correct.

23 MS. CAHOY: I think we'll move onto the next
24 section after the break, so this would be a good time
25 from my perspective to take a break. We can go off 13:25:53

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1 record.

2 THE VIDEOGRAPHER: We are off the record.

3 The time is 2:26 p.m.

4 (Recess taken.)

5 THE VIDEOGRAPHER: We are back on the 13:46:24

6 record. The time is 2:46 p.m.

7 BY MS. CAHOY:

8 Q. Hi, Mr. Humphrey.

9 So before the break we were talking about

10 Section 5 of your opening report, and I want to turn 13:46:48

11 next to Section 6 which should be -- pick up on that

12 page we left off on, page 15 of your opening report.

13 A. Yes, I'm there.

14 Q. In that paragraph 37, the last sentence I

15 believe you mentioned this before, but earlier in 13:47:08

16 your testimony you said there that "The key factors

17 in making significant design or component changes to

18 any product are generally associated with

19 performance/reliability, availability, and/or cost,"

20 correct? 13:47:24

21 A. Yes.

22 Q. What is the basis of your opinion there that

23 those are the key factors in making significant

24 design or component changes?

25 A. I guess the better part of 40 years in an 13:47:38

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1 A. Okay. I'm getting there. This is 92, 94,
2 okay. 094, correct. Yes.

3 Q. And just to make sure we're on the same
4 page, it says: "Instrument Data Chips: RFID
5 (IS4000) vs. Dallas (IS3000)" at the top.

14:28:48

6 Is that the page you're on?

7	A. Yes.
---	---------

8 Q. Does this look familiar?

9	A. Yes.
---	---------

10 Q. So this is a chart that appears to be
11 comparing the RFID chip in the X/Xi instruments to
12 the Dallas chips in the S/Si instruments, correct?

14:28:59

13	A. Yes.
----	---------

14 Q. And if you look at the middle row that says

15 "Storage Space," do you see that?

14:29:17

16	A. Yes.
----	---------

17 Q. Under the RFID (IS4000) chip, it says
18 "8k bytes."

19	A. Yes.
----	---------

20 Q. And under the Dallas chip, it says

21 "2k bytes."

14:29:27

22	A. Yes.
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23 Q. Does that refresh your memory of the memory
24 size difference between the Atmel CryptoRF chip used
25 in the X/Xi EndoWrists and the Dallas chip used in

14:29:48

1 the S/Si EndoWrists?

2 A. Yes, that sounds about right, 4 to 1.

3 Q. So picking up on the math calculations we

4 performed earlier, so 8,000 bytes would be

5 approximately 64,000 bits, right? 14:30:06

6 A. Right.

7 Q. That would be the memory storage space for

8 the RFID chip in the X/Xi instruments?

9 A. Correct.

10 Q. And the Dallas chip has approximately 16,000 14:30:17

11 bits?

12 A. Correct.

13 MS. CAHOY: So with that, Miriam, could we

14 pull up -- we can close that exhibit. Could we mark

15 Exhibit 319, and let's go with tab 12, please. 14:30:59

16 (The document referred to was marked as

17 Exhibit 319 for identification and is attached

18 hereto.)

19 MS. ARGHAVANI: Should be introduced.

20 BY MS. CAHOY:

21 Q. So, Mr. Humphrey, I'm marking as Exhibit 319

22 a document that ends in the first page on -- the

23 Bates stamp on the first page is Intuitive-02068686.

24 A. I'm trying to load it.

25 Q. This is a document that I'll represent to 14:32:01

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1 you, it appears that you cite on -- in footnote 52 of
2 your opening report. So that's in paragraph 51, page
3 21, footnote 52, where it says 30(b)(6) deposition of
4 Grant Duque, Exhibit 266, Intuitive-02068686.

5 A. Paragraph 51, you say? 14:32:33

6 Q. Yes. Paragraph 51, footnote 52, which is
7 right at the end of that paragraph.

8 A. Yes, okay.

9 Q. Has that one loaded for you?

10 A. Yes, it's loaded. 14:33:01

11 Q. Do you recognize this document as a 2011
12 e-mail produced by Intuitive that you reviewed in
13 connection with preparing your report?

14 A. Yes.

15 Q. If you look down towards the bottom of that 14:33:20
16 document, the original document says from Thomas
17 Cooper, Monday, May 23, 2011, and then "to" and with
18 some other names.

19 Do you see that?

20 A. Yes. 14:33:35

21 Q. If you go down almost to the bottom, there
22 is a numbered list and there is a number 5 that says:
23 "Our 64k bit requirement is a bit unusual."

24 Do you see that?

25 A. Yes, okay. 14:34:00

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1 Q. What is your understanding of what the
2 reference to 64k bit requirement means?

3 A. The size of the memory.

4 Q. So it's referring to a 64,000 bit
5 requirement, correct? 14:34:23

6 A. Yes.

7 Q. And the CryptoRF Atmel chip has a 64,000 bit
8 memory?

9 A. Yes, that's correct.

10 Q. And the Dallas chip that was used in the 14:34:39
11 S/Si instruments does not have a 64,000 bit memory,
12 correct?

13 A. That's correct. It's not clear to me in
14 this reference as to what product they're referring
15 to. The rest of that sentence refers to Ducati and 14:35:09
16 Orion, but I guess I think Orion is their name for
17 one of the X or Xi instruments.

18 Q. But you're not sure what this e-mail is
19 discussing?

20 A. I'm not sure what the 64-bit requirement, 14:35:37
21 what's the need for that? It says it's a bit
22 unusual, but I don't know much or -- I'm not sure why
23 the writer is using that terminology, that
24 description.

25 Q. So the writer is describing a 64k bit 14:35:58

1 requirement. You don't know why they had that
2 requirement?

3 A. No. I'm not sure why or how they're using
4 the 64 bits, if they're using all 64 bits, and I
5 guess I'm not sure why they're stating it's unusual. 14:36:17
6 Unusual because the Dallas chip has a smaller memory
7 maybe, I don't know. I'm not sure what the context
8 is.

9 Q. You don't know what the context of this
10 e-mail is? 14:36:32

11 A. Not for that particular statement, the
12 unusual nature of the 64 bit requirement.

13 Q. You weren't involved in this discussion at
14 Intuitive?

15 A. No. 14:36:45

16 Q. You don't have any more background on what
17 happened before or after this discussion?

18 A. That's correct.

19 Q. Let's turn to the next page of your report,
20 so you can close that one, so page 22. Actually 14:37:02
21 sorry, let's go -- I gave you the wrong reference.

22 Let's go to -- I'm trying to find the section on the

23 [REDACTED] I just have it written
24 down wrong here in my notes. I think it's
25 paragraph 56, if you can turn there. 14:38:46

1 A. I'm there.

2 Q. [REDACTED]

3 [REDACTED]

4 A. Yes.

5 Q. [REDACTED]

14:39:11

6 A. I [REDACTED]

7 [REDACTED]

8 Q. Yes.

9 [REDACTED]

10 [REDACTED],

14:39:34

11 [REDACTED]

12 A. Yes.

13 Q. [REDACTED]

14 [REDACTED]

15 A. That's correct.

14:39:57

16 Q. [REDACTED]

17 [REDACTED]

18 A. Yes. It's [REDACTED]

19 [REDACTED]

20 [REDACTED]

14:40:24

21 [REDACTED]

22 [REDACTED].

23 Q. Let's turn to those figures.

24 Are you referencing the ones that come after

25 paragraph 58?

14:40:51

1 good time for another break if you all want a break.

2 THE WITNESS: Sounds good.

3 THE VIDEOGRAPHER: We are off the record.

4 The time is 3:49 p.m.

5 (Recess taken.) 14:49:40

6 THE VIDEOGRAPHER: We are back on the

7 record. The time is 4:07 p.m.

8 BY MS. CAHOY:

9 Q. Mr. Humphrey, I would like to turn back now
10 to your Rebotix Report or your original report, which 15:07:11
11 appears as Attachment 3 to Exhibit 316.

12 So that's Attachment 3 to your opening
13 report in this case. I'm going to start on page 14
14 of that report when you're able to get there.

15 A. Okay. I'm there. 15:08:02

16 Q. And we've discussed at a few points today
17 that a number of your opinions in this Rebotix Report
18 rely on information that you learned from Ms. Mandel;
19 is that correct?

20 A. Yes. 15:08:22

21 Q. Why did you rely on Ms. Mandel for purposes
22 of developing your opinions in this Rebotix Report?

23 A. She was boots on the ground. She was
24 hands-on as far as working directly with the
25 EndoWrist and the Atmel CryptoRF chipping 15:08:52

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1 communication.

2 Q. Did she have any experience or expertise
3 that you didn't with respect to reverse engineering
4 the X/Xi use counter?

5 A. No. I don't recall anything specific about 15:09:13
6 that.

7 Q. So you believe this is something you could
8 have done yourself?

9 A. Well, it would have taken a team of us to do
10 that. My expertise tends to be more in the hardware, 15:09:35
11 not the software side of things, so I would have used
12 one of my software experts probably to -- just as I
13 think there are teams of people working for both
14 Rebotix and Restore, as well as even third-party
15 labs, I think working to try and address this issue. 15:09:59

16 Q. Would the software components include
17 encryption?

18 A. Yes.

19 Q. Would the software components also include
20 the data that's stored in the memory of the chip? 15:10:22

21 A. Possibly some of the decoding of the data or
22 decrypting the data if the data was indeed encrypted.

23 Q. Did you have any concerns that attempting to
24 replicate Ms. Mandel's methodology could present
25 copyright problems? 15:11:04

1 A. No, I didn't really consider that.

2 Q. When you attempt to reverse engineer devices
3 as part of your consulting work, do you consider
4 copyright laws?

5 A. We try to make sure we stay within the law 15:11:41
6 with any of the reverse engineering work we're doing.

7 Q. Have you heard of a law called the Digital
8 Millennial Copyright Act?

9 A. I've heard of it, yes.

10 Q. Is that one of the laws that you try to stay 15:11:54
11 within when you're reverse engineering devices?

12 A. Yes. We try to observe whatever laws might
13 apply to the work that we're doing.

14 Q. You try to stay within anti-hacking laws
15 when you're reverse engineering devices? 15:12:28

16 A. Yes. We avoid violating any law that we're
17 aware of.

18 Q. If you look at footnote 46 on page 14 where
19 you're referencing a Proxmark III PM RFID research
20 tool. 15:13:04

21 Do you see that?

22 A. I'm sorry. Which page?

23 Q. Page 14 of your Rebotix Report, should be
24 footnote 46.

25 A. Yes. 15:13:23

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1 Atmel CryptoRF chip or on a nonreprogrammable portion
2 of the Atmel CryptoRF chip?

3 A. No, I don't know.

4 Q. Continuing down that page in paragraph 45,
5 here you call the extraction of the image from the 15:26:00
6 chip's memory, speaking here of the Atmel chip, a
7 simple process, correct?

8 A. Yes.

9 Q. So it's not just reprograming that you
10 called simple, you also called the extraction of the 15:26:27
11 image simple, right?

12 A. Yes, it's straightforward.

13 Q. And that's based on your understanding of
14 what Rebotix had found in its own analyses?

15 A. No. That's just based upon dumping the 15:26:45
16 contents of EEPROM memory.

17 Q. Is it a simple process to dump the contents
18 of EEPROM memory from a read protected portion of a
19 chip?

20 A. Simple, of course, is a relative term, but 15:27:12
21 yes, given sufficient resources, mapping the contents
22 of memory is doable. Physical extraction methods are
23 not limited by re-protection.

24 Q. So here what you mean is that if it can be
25 physically extracted, given sufficient resources, you 15:27:55

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1 view that as simple?

2 A. Yes. It's -- well, not necessarily
3 inexpensive, but it's straightforward.

4 Q. But it's a simple process to extract the
5 file whether or not it's in a read protected portion 15:28:20
6 of the chip?

7 A. Yes, it's relatively simple.

8 Q. So extracting an image of a chip is simple,
9 reprograming a chip is simple, correct?

10 MR. VAN HOVEN: Objection to form. 15:28:47

11 THE WITNESS: No. The reprograming isn't
12 necessarily simple, that could be challenging. It
13 depends on how you go about it, when you're trying to
14 reprogram or program a new substitute device.

15 BY MS. CAHOY: 15:29:22

16 Q. As long as the data is in a reprogrammable
17 portion of the chip, you think it's significantly
18 simpler than what Rebotix did on the S/Si EndoWrist
19 resets, right?

20 A. Hypothetically, implementing the method of 15:29:38
21 resetting the counter could be simpler than the
22 interceptor approach used for the Si EndoWrist.

23 Q. What do you mean by "hypothetically"?

24 A. I don't know whether anyone has been
25 successful up to this time and actually demonstrating 15:30:19

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1 the capability. The deposition from Kevin May and
2 Restore, and Stan Hamilton's testimony indicate that
3 they are extremely close and that they expect to
4 accomplish this by 2023, this year, later this year.

5 So based upon the people who are actually 15:30:53
6 working on it and have seen the data, it certainly
7 sound doable.

8 Q. Can you turn to paragraph 47 on the next
9 page.

10 A. Paragraph 47? 15:31:14

11 Q. Yes.

12 A. Okay.

13 Q. Can you read the second sentence in that
14 paragraph, please.

15 A. "After image extraction, the process of 15:31:38
16 resetting the usage counter on the X/Xi EndoWrists
17 will be easier than resetting the usage counter on
18 the S/Si EndoWrists due to the reprogrammable nature
19 of the CryptoRF chip."

20 Q. So here you're not speaking in 15:32:04
21 hypotheticals, you said it would be than the S/Si
22 EndoWrist process due to the reprogrammable nature of
23 the chip, right?

24 A. Yes. Based upon successful image extraction
25 and the reprograming of a CryptoRF chip should be 15:32:24

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1 straightforward, and maybe I should say the
2 programing of a CryptoRF chip should be
3 straightforward. Maybe that should be expanded to
4 programmable, not just reprogrammable.

5 Q. Go ahead. 15:33:03

6 A. I'm looking for another reference here. If
7 you look at page 20 from my opening report.

8 Q. What should I be looking at there?

9 A. Paragraph 49, an excerpt from the e-mail --
10 anyway the excerpt from the e-mail says: "The unique 15:34:42

11 ID doesn't prevent reproprocessors from putting lives
12 back on our instruments. In principle, you could
13 copy the blob of data off a new instrument, then put
14 the same blob of data back on once it's expired, and
15 it will be good as new. I believe the Dallas 15:35:02
16 implementation uses 'write once' region in the tag to
17 ensure the decremented lives stay decremented."

18 So this is an excerpt from an Intuitive
19 e-mail that basically alerts those in the design --
20 in the engineering community of the potential to just 15:35:28
21 again reprogram or program a same chip with the
22 extracted image and make it appear like a new
23 instrument.

24 Q. Do you think that an internal Intuitive
25 e-mail alerts the engineering community to something? 15:35:52

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1 A. "Several additional factors make the process
2 of Rebotix's image analysis for the Xi EndoWrist
3 CryptoRF chip easier than others that I've
4 encountered in my career."

5 Q. What's an example of a chip you were 15:42:33
6 referencing as one of the others you have encountered
7 in your career?

8 A. We've encountered chips that were physically
9 rendered very difficult to physically analyze because
10 of protective materials that had been applied to the 15:43:13
11 chips so that deprocessing the chip was extremely
12 difficult, without destroying the chip, without
13 destroying the information you were looking at. That
14 would be one example.

15 Q. Are there any other examples that you've 15:43:37
16 encountered in your career that you think would be
17 more difficult?

18 A. It kind of goes along with what I'm
19 mentioning in paragraph 71, 70 and 71 just below.
20 The fact that third parties like Rebotix have 15:43:57
21 familiarity with the embedded software and the data
22 in the memories of the EndoWrists of the S/Si
23 EndoWrists certainly gives them a leg up on analyzing
24 the images extracted from the X/Xi because they're
25 generally similarities within the same company or 15:44:32

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1 same product line, lines of codes are used and
2 reused.

3 It's unusual for software to be totally new,
4 so there is an advantage that they will have in
5 analyzing these images since they've already done it 15:44:56
6 once for the earlier generation tools.

7 Q. So that's what you're referencing in
8 paragraph 76 when you say: "The similarity between
9 the data extracted from the Xi EndoWrist and prior
10 data analyzed by Rebotix on the S/Si EndoWrist makes 15:45:15
11 image analysis a straightforward process"?

12 MR. VAN HOVEN: Objection to form.

13 THE WITNESS: Yes. And familiarity with the
14 software in question is certainly an advantage. It's
15 generally quite helpful. I've had that experience. 15:45:43

16 BY MS. CAHOY:

17 Q. It makes it more straightforward to --

18 A. Yes. Often that's true.

19 Q. But also you said here it would make it more
20 straightforward for Rebotix, right? 15:45:58

21 A. Yes, it should.

22 Q. Are you aware that SIS has a damages expert
23 in this case who has submitted a few reports?

24 A. I may have, again, anecdotally heard that
25 there were damage experts that were involved, but 15:46:59

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1 I've not seen any of their work or had any
2 communication with them. I don't know who they are.

3 Q. You've never spoken with SIS's damages
4 expert?

5 A. No. 15:47:19

6 Q. Have you heard of a hospital called Larkin
7 Community Hospital?

8 A. I have not.

9 Q. What about a hospital called Valley Medical
10 Center? 15:47:53

11 A. No, I'm not familiar with it.

12 Q. What about Franciscan Hospitals in the
13 Illinois and Indiana area?

14 A. No, I'm not familiar with them.

15 Q. Have you ever spoken with anyone from any of 15:48:08
16 those hospitals?

17 A. No.

18 Q. Have you ever spoken with Counsel for those
19 hospitals at firms such as Boni & Zach (phonetic),
20 Cohen Milstein or SRK Attorneys? 15:48:24

21 A. No.

22 Q. So as far as you're aware, you've never
23 spoken with either the hospitals or their counsel
24 that are suing Intuitive?

25 A. That's correct. 15:48:55

1 Q. Who wrote your Rebotix Report?

2 A. I wrote it.

3 Q. Did you receive input on that report from
4 Rebotix's counsel?

5 A. There was certainly some internal review and 15:49:28
6 some feedback on it.

7 MS. CAHOY: If we could take another break
8 now, I think I'm close to done. I just want to look
9 back through and see if I have any questions left.

10 THE WITNESS: Sounds good. 15:50:24

11 MR. VAN HOVEN: Let's go off the record.

12 THE VIDEOGRAPHER: We are off the record.

13 The time is 4:50 p.m.

14 (Recess taken.)

15 THE VIDEOGRAPHER: We are back on the 16:09:20
16 record. The time is 5:09 p.m.

17 BY MS. CAHOY:

18 Q. Mr. Humphrey, have any of your expert
19 opinions been excluded before?

20 A. No. 16:09:53

21 Q. Have you ever talked to someone identified
22 to you as an expert in this case by the name of
23 Philip Phillips?

24 A. No, not that I can recall.

25 Q. Have you ever talked to someone identified 16:10:14

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1 to you as an expert in this case by the name of Jean
2 Sargeant?

3 A. No.

4 Q. Have you ever talked to someone identified
5 to you as an expert in this case by the name of 16:10:28
6 Amandeep Mahal?

7 A. No.

8 Q. Have you ever talked to someone identified
9 to you as an expert in this case by the name of
10 Russell Lamb? 16:10:42

11 A. No.

12 Q. Have you ever talked to someone identified
13 to you as an expert in this case by the name of
14 Richard Bero?

15 A. No. 16:10:52

16 Q. Have you ever talked to someone identified
17 to you as an expert in this case by the name of Kim
18 Parnell?

19 A. No.

20 Q. Have you ever talked to someone identified 16:11:02
21 to you as an expert by the name of Einer Elhauge?

22 A. No.

23 MS. CAHOY: That's all the questions I have
24 today. I appreciate your time, Mr. Humphrey.

25 I would ask that we designate the transcript 16:11:20

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1 highly confidential, attorneys' eyes only until we
2 have a chance to review it under the provision of the
3 protective order.

4 MR. VAN HOVEN: No questions from
5 Plaintiff's counsel. 16:11:33

6 THE REPORTER: Kate, do you need this
7 expedited or normal delivery?

8 MS. CAHOY: I'll take a rough and expedited,
9 please.

10 THE REPORTER: When would you like it? 16:11:58

11 MS. CAHOY: Can you get it by Monday?

12 THE REPORTER: Sure.

13 MR. VAN HOVEN: Just a copy, normal time.

14 THE VIDEOGRAPHER: We are off the record.

15 The time is 5:12 p.m. on March 15, 2023. 16:12:26

16 This concludes today's testimony given by
17 Mr. Kurt Humphrey. The total number of media units
18 used was seven, and will be retained by Veritext
19 Legal Solutions.

20 (The deposition was concluded at 4:12 p.m.) 16:12:54

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